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Ex1 + Ex2

```
clc;
clear;
close all;
%p.s - it was a class exercise
```

Section a

```
a = load ('data1.mat');
X1 = a.X;
y1 = a.y;
[theta1,k1] = my_perceptron_train(X1,y1);
test_err1 = my_perceptron_test(theta1,X1,y1);
fprintf('The number of the relative errors for data1 are: %g
\n',test_err1);
fprintf('The angle between theta and [1 0] is : %g degrees
\n',cos_x_y(theta1,[1 0]'));
fprintf('The number of steps for the convergence of the pecpetron
 algorithem is: %g\n',k1);
```

```
The number of the relative errors for data1 are: 0
The angle between theta and [1 0] is : 136.356 degrees
The number of steps for the convergence of the pecpetron algorithem
 is: 55
```

Section b

```
b = load ('data2.mat');
X2 = b.X;
y2 = b.y;
[theta2,k2] = my_perceptron_train(X2,y2);
test_err2 = my_perceptron_test(theta2,X2,y2);
fprintf('The number of the relative errors for data2 are: %g
\n',test_err2);
fprintf('The angle between theta and [1 0] is : %g degrees
\n',cos_x_y(theta2,[1 0]'));
fprintf('The number of steps for the convergence of the pecpetron
 algorithem is: %g\n',k2);
```

```
The number of the relative errors for data2 are: 0
The angle between theta and [1 0] is : 134.965 degrees
The number of steps for the convergence of the pecpetron algorithem
 is: 574
```

Sectioin c

```
geo_a = geometric_margins(theta1,X1);
fprintf('The geometric margins for Section a(the minimum projection)
 is: %g\n',geo_a(2));
geo_b = geometric_margins(theta2,X2);
fprintf('The geometric margins for Section b(the minimum projection)
 is: %g\n',geo_b(1));
```

```
The geometric margins for Section a(the minimum projection) is:
 24.0479
The geometric margins for Section b(the minimum projection) is: 28.851
```

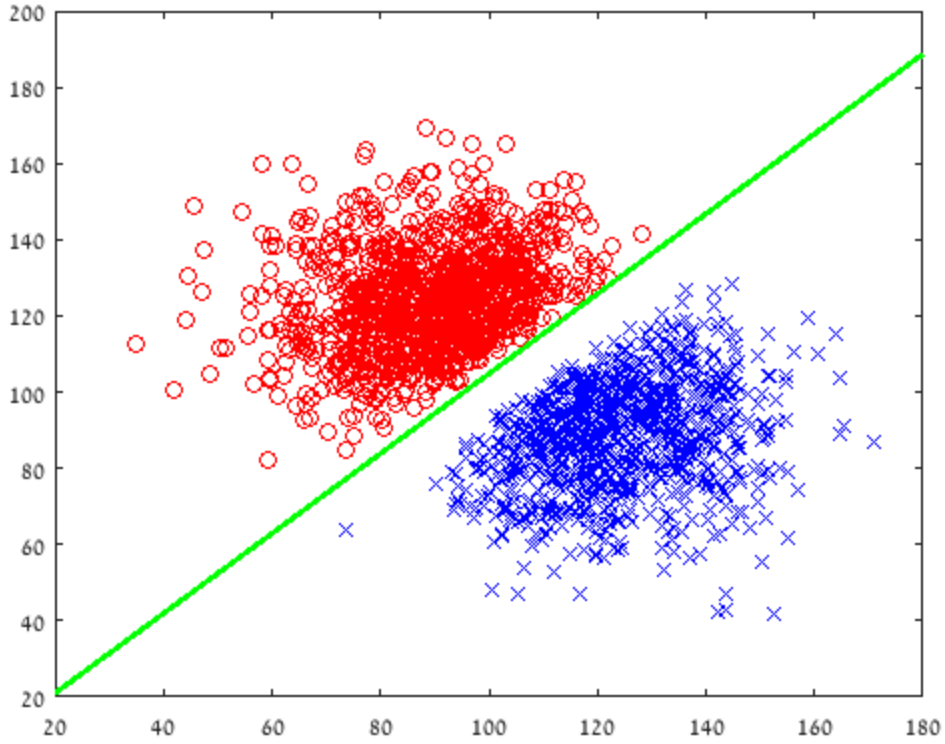
Section d

```
fprintf('The R_a is: %g\n',max_normR(X1));
fprintf('The R_b is: %g\n',max_normR(X2));
```

```
The R_a is: 170.991
The R_b is: 164.687
```

Section e

```
figure(1)
plotPespetron(X1,y1,theta1);
figure(2)
plotPespetron(X2,y2,theta2);
```


200
180
160
140
120
100
80
60
40
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20
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60
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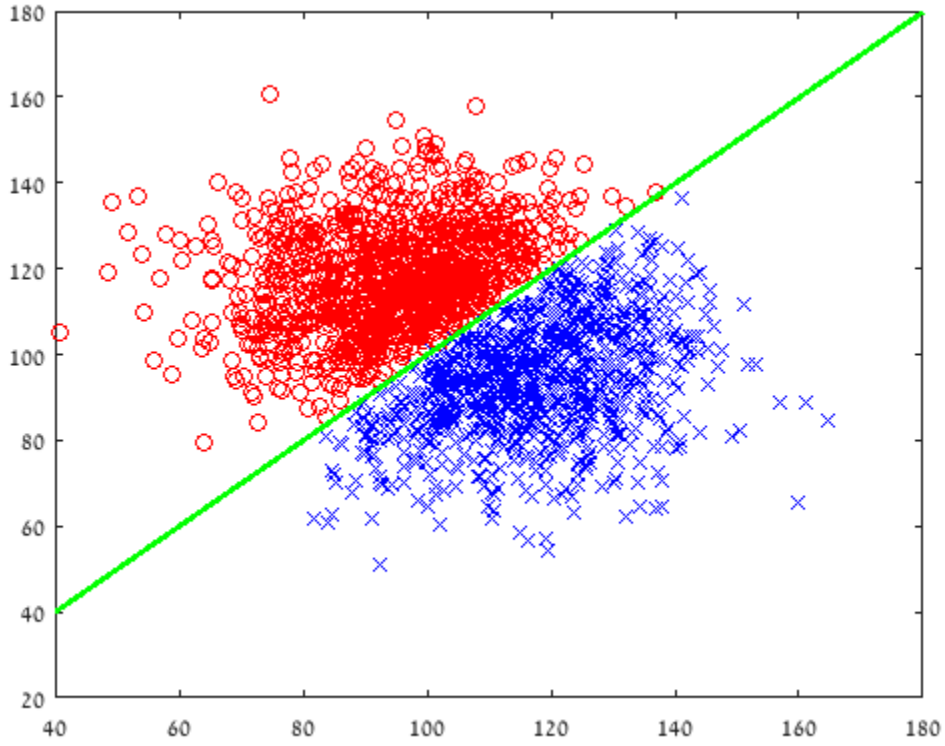
100
120
140
160
180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